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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,460	09/29/2003	Hiromu Sugiyama	0020-5182P	6659

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EXAMINER	
RUTHKOSKY, MARK	

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 09/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/671,460	SUGIYAMA ET AL.	
	Examiner	Art Unit	
	Mark Ruthkosky	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 June 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The rejection of claims 1-14 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention has been overcome by applicant's amendment to the claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda et al (EP 1,246,278.)

The instant claims are to an electrode used for a non-aqueous electrode secondary battery, which comprises a current collector of a metallic material not to be alloyed with Li and a pattern of dots formed on the current collector, which is a metallic material able to be alloyed with Li, wherein the diameter of each dot is 1-500 micrometers, and the occupancy rate of the dots on the current collector is 50 - 90%.

Ikeda et al (EP 1,246,278) teaches an electrode used for a non-aqueous electrolyte secondary battery, which comprises a current collector of a metallic material (claim 35), which is not alloyed with Li and dots of a metallic material which are able to be alloyed with Li and

formed in a form of pattern on the current collector (claims 1, 6, 7, 32-35 and 41, figures 10-11.) Materials of group 14 are noted in claim 7. The materials are inherently porous as they are the same materials used in the instant application. Columnar portions are noted on the current collector with spaces provided around the column (p. 81.) The shape of the material is convex (see figure 10c.) The diameter of the dots is in the range of 1-500 micrometers (figs. 11-12). Although not all dots are taught to be in the range of 1-500nm, it would be obvious to one of ordinary skill in the art to include dots in this range based on the overall thickness of the electrodes and the teaching of the sizes of the columns taught in figures 11-12. The thickness of the film is about 10 microns (p. 78-82.) Crystal grain sizes on the order of 10 microns are noted in Table 2. Means spacing of local peaks being greater than 5 microns are noted in Table 3. The surface roughness is on the order of 0.05-5 micron (p. 24.) Mixed layer alloys of Cu and group Iv elements are taught in claims 19-25 and p. 159-162. The dots are taught to be of an amorphous material (claims 9-15.)

The reference does not teach that the occupancy rate of the dots on the current collector is 50 - 90%. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include an occupancy rate in the range of 50-90% as the material of the dots is used to incorporate lithium in an anode, while open space is taught on the electrode surface for the expansion and contraction of the alloyed material. Lithium ions are intercalated into the material that forms the dots. It would be obvious to add the maximum amount of lithium occluding material on the electrode to increase the capacity of the battery. One skilled in the art would utilize as much lithium as possible in the battery, while allowing for opened spaces as taught in Ikeda to reduce stress on the electrode by providing space on the electrode surface (see

paragraphs 5-12 and 19-24.) The open spaces help to prevent for the loss of active material during charging and discharging of the battery. As the art recognizes the use of the lithium intercalating material and the advantage of open spaces on the electrode, adjusting the occupancy rate would be obvious to the skilled artesian in order to balance the amount of alloy material with the amount of space that is needed to prevent stress on the electrode (p. 19-26.) Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation, In re *Aller, Lacey and Hall*, 105 U.S.P.Q. 233, 235. The artesian would have found the claimed invention to be obvious in light of the teachings of the references.

Response to Arguments

Applicant's arguments filed 6/21/2006 have been fully considered but they are not persuasive. Applicant argues that the occupancy rate of dots on the current collector is almost 100%. Applicant further argues that the diameter of each dot is 1-500 microns. These arguments are not persuasive. Applicant has noted the teachings of Ikeda et al (EP 1,246,278) that clearly show that the thin film is divided into gaps and that the film is divided into columns by the gaps. This limitation is clearly taught in the claims (see claims 25-26) and reads upon the claimed limitation of a dot. Figures 11-12 show that the dots have a diameter of the order of 1-500 microns. Thus, the only limitation not addressed by a specific value in Ikeda et al (EP 1,246,278) is the occupancy rate of the dots, which is claimed to be between 50 and 90 percent.

Ikeda et al (EP 1,246,278), however, does address the limitation in that the open spaces between columns are described to help prevent the loss of active material during charging and

discharging of the battery. As the art recognizes the use of the lithium intercalating material in the columns, and the advantage of open spaces on the electrode, adjusting the occupancy rate would be obvious to the skilled artesian in order to balance the amount of alloy material with the amount of space that is needed to prevent stress on the electrode (p. 19-26.) Lithium ions are intercalated into the material that forms the dots to form the alloy. It would be obvious to add the maximum amount of lithium occluding material on the electrode in order to increase the capacity of the battery and give the battery the largest amount of active material per space. One skilled in the art would utilize as much lithium as possible in the battery, while allowing for opened spaces as taught in Ikeda to reduce stress on the electrode by providing space on the electrode surface (see paragraphs 5-12 and 19-24.) It would have been obvious to one of ordinary skill in the art at the time the invention was made to include an occupancy rate in the range of 50-90% as the material of the dots is used to incorporate lithium in an anode, while open space is taught on the electrode surface for the expansion and contraction of the alloyed material.

With regard to applicant's arguments to the examples and comparative example, the examples noted don't compare the examples of the instant application with the prior art. The comparative example is not the same as the prior art, which teaches the use of columns as noted. Thus, the results are not comparable or considered unexpected.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Ruthkosky whose telephone number is 571-272-1291. The examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-6:30.) If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free.)

Mark Ruthkosky
Primary Patent Examiner
Art Unit 1745